CLAIMS

1. A method of stimulating phosphate absorption by a cell, comprising contacting the cell with a stanniocalcin polypeptide selected from the group consisting of:

(a) a polypeptide comprising V-34 to A-247 of SEQ ID NO:2;

(b) a polypeptide having an amino acid sequence that is at least 90% identical to (a), wherein the polypeptide has stanniocalcin biological activity;

(c) a polypeptide comprising a fragment of the amino acid sequence of SEQ ID NO:2, wherein the fragment has stanniocalcin biological activity;

(d) a polypeptide comprising a fragment of the polypeptide encoded by the human cDNA of ATCC Deposit No. 75652, wherein the fragment has stanniocalcin biological activity;

(e) a polypeptide comprising an N-terminal deletion fragment described by the general formula m-247 of SEQ ID NO:2, wherein m is an integer from 2 to 242 and the deletion fragment has stanniocalcin biological activity;

(f) a polypeptide comprising a C-terminal deletion fragment described by the general formula 1-n of SEQ ID NO:2, wherein n is an integer between 7 to 246 and the deletion fragment has stanniocalcin biological activity; and

(g) a polypeptide comprising an N-terminal and C-terminal deletion fragment described by the general formula m-n of SEQ ID NO:2, wherein m is an integer from 2 to 242, n is an integer from 7 to 246, and the deletion fragment has stanniocalcin biological activity.

2. The method of claim 1, wherein the polypeptide is (a).

3. The method of claim 1, wherein the polypeptide is (b).

4. The method of claim 1, wherein the polypeptide is (c).

5. The method of claim 1, wherein the polypeptide is (d).

6. The method of claim 1, wherein the polypeptide is (e).

7. The method of claim 1, wherein the polypeptide is (f).

8. The method of claim 1, wherein the polypeptide is (g).

9. The method of claim 1, wherein the polypeptide has an amino acid sequence that is at least 95% identical to (a) and has stanniocalcin biological activity.

10. The method of claim 1, wherein the polypeptide is fused to a heterolgous polypeptide.

11. The method of claim 10, wherein the heterolgous polypeptide comprises a constant domain (Fc) of immunoglobulin or a portion thereof.

12. The method of claim 10, wherein the heterologous polypeptide comprises albumin.

13. The method of claim 12, wherein albumin comprises human serum albumin.

14. The method of claim 1, wherein the cell is a neural cell.

15. The method of claim 1, wherein the cell is a cardiac cell.

16. A method of increasing resistance of a cell to hypoxic stress, comprising contacting the cell with a stanniocalcin polypeptide selected from the group consisting of:

(a) a polypeptide comprising V-34 to A-247 of SEQ ID NO:2;

(b) a polypeptide having an amino acid sequence that is at least 90% identical to (a), wherein the polypeptide has stanniocalcin biological activity;

(c) a polypeptide comprising a fragment of the amino acid sequence of SEQ ID NO:2, wherein the fragment has stanniocalcin biological activity;

(d) a polypeptide comprising a fragment of the polypeptide encoded by the human cDNA of ATCC Deposit No. 75652, wherein the fragment has stanniocalcin biological activity;

(e) a polypeptide comprising an N-terminal deletion fragment described by the general formula m-247 of SEQ ID NO:2, wherein m is an integer from 2 to 242 and the deletion fragment has stanniocalcin biological activity;

(f) a polypeptide comprising a C-terminal deletion fragment described by the general formula 1-n of SEQ ID NO:2, wherein n is an integer between 7 to 246 and the deletion fragment has stanniocalcin biological activity; and

(g) a polypeptide comprising an N-terminal and C-terminal deletion fragment described by the general formula m-n of SEQ ID NO:2, wherein m is an integer from 2 to 242, n is an integer from 7 to 246, and the deletion fragment has stanniocalcin biological activity.

17. The method of claim 16, wherein the polypeptide is (a).

18. The method of claim 16, wherein the polypeptide is (b).

19. The method of claim 16, wherein the polypeptide is (c).

20. The method of claim 16, wherein the polypeptide is (d).

21. The method of claim 16, wherein the polypeptide is (e).

22. The method of claim 16, wherein the polypeptide is (f).

23. The method of claim 16, wherein the polypeptide is (g).

24. The method of claim 16, wherein the polypeptide has an amino acid sequence that is at least 95% identical to (a) and has stanniocalcin biological activity.

25. The method of claim 16, wherein the polypeptide is fused to a heterolgous polypeptide.

26. The method of claim 25, wherein the heterolgous polypeptide comprises a constant domain (Fc) of immunoglobulin or a portion thereof.

27. The method of claim 25, wherein the heterologous polypeptide comprises albumin.

28. The method of claim 27, wherein albumin comprises human serum albumin.

29. The method of claim 16, wherein the cell is a neural cell.

30. The method of claim 16, wherein the cell is a cardiac cell.

31. The method of claim 16, wherein hypoxic stress comprises ischemia.

32. A method of protecting a cell challenged by hypoxic stress, comprising contacting the cell with a stanniocalcin polypeptide selected from the group consisting of:

(a) a polypeptide comprising V-34 to A-247 of SEQ ID NO:2;

(b) a polypeptide having an amino acid sequence that is at least 90% identical to (a), wherein the polypeptide has stanniocalcin biological activity;

(c) a polypeptide comprising a fragment of the amino acid sequence of SEQ ID NO:2, wherein the fragment has stanniocalcin biological activity;

(d) a polypeptide comprising a fragment of the polypeptide encoded by the human cDNA of ATCC Deposit No. 75652, wherein the fragment has stanniocalcin biological activity;

(e) a polypeptide comprising an N-terminal deletion fragment described by the general formula m-247 of SEQ ID NO:2, wherein m is an integer from 2 to 242 and the deletion fragment has stanniocalcin biological activity;

(f) a polypeptide comprising a C-terminal deletion fragment described by the general formula 1-n of SEQ ID NO:2, wherein n is an integer between 7 to 246 and the deletion fragment has stanniocalcin biological activity; and

(g) a polypeptide comprising an N-terminal and C-terminal deletion fragment described by the general formula m-n of SEQ ID NO:2, wherein m is an integer from 2 to 242, n is an integer from 7 to 246, and the deletion fragment has stanniocalcin biological activity.The method of claim 64, wherein the polypeptide is (a).

33. The method of claim 32, wherein the polypeptide is (a).

34. The method of claim 32, wherein the polypeptide is (b).

35. The method of claim 32, wherein the polypeptide is (c).

36. The method of claim 32, wherein the polypeptide is (d).

37. The method of claim 32, wherein the polypeptide is (e).

38. The method of claim 32, wherein the polypeptide is (f).

39. The method of claim 32, wherein the polypeptide is (g).

40. The method of claim 32, wherein the polypeptide has an amino acid sequence that is at least 95% identical to (a) and has stanniocalcin biological activity.

41. The method of claim 32, wherein the polypeptide is fused to a heterolgous polypeptide.

42. The method of claim 41, wherein the heterolgous polypeptide comprises a constant domain (Fc) of immunoglobulin or a portion thereof.

43. The method of claim 41, wherein the heterologous polypeptide comprises albumin.

44. The method of claim 43, wherein albumin comprises human serum albumin.

45. The method of claim 32, wherein the cell is a neural cell.

46. The method of claim 32, wherein the cell is a cardiac cell.

47. The method of claim 32, wherein hypoxic stress comprises ischemia.

48. A method of protecting a cell against harmful calcium levels, comprising administering to the cell a stanniocalcin polypeptide selected from the group consisting of:

(a) a polypeptide comprising V-34 to A-247 of SEQ ID NO:2;

(b) a polypeptide having an amino acid sequence that is at least 90% identical to (a), wherein the polypeptide has stanniocalcin biological activity;

(c) a polypeptide comprising a fragment of the amino acid sequence of SEQ ID NO:2, wherein the fragment has stanniocalcin biological activity;

(d) a polypeptide comprising a fragment of the polypeptide encoded by the human cDNA of ATCC Deposit No. 75652, wherein the fragment has stanniocalcin biological activity;

(e) a polypeptide comprising an N-terminal deletion fragment described by the general formula m-247 of SEQ ID NO:2, wherein m is an integer from 2 to 242 and the deletion fragment has stanniocalcin biological activity;

(f) a polypeptide comprising a C-terminal deletion fragment described by the general formula 1-n of SEQ ID NO:2, wherein n is an integer between 7 to 246 and the deletion fragment has stanniocalcin biological activity; and

(g) a polypeptide comprising an N-terminal and C-terminal deletion fragment described by the general formula m-n of SEQ ID NO:2, wherein m is an integer from 2 to 242, n is an integer from 7 to 246, and the deletion fragment has stanniocalcin biological activity.The method of claim 64, wherein the polypeptide is (a).

49. The method of claim 48, wherein the polypeptide is (a).

50. The method of claim 48, wherein the polypeptide is (b).

51. The method of claim 48, wherein the polypeptide is (c).

52. The method of claim 48, wherein the polypeptide is (d).

53. The method of claim 48, wherein the polypeptide is (e).

54. The method of claim 48, wherein the polypeptide is (f).

55. The method of claim 48, wherein the polypeptide is (g).

56. The method of claim 48, wherein the polypeptide has an amino acid sequence that is at least 95% identical to (a) and has stanniocalcin biological activity.

57. The method of claim 48, wherein the polypeptide is fused to a heterolgous polypeptide.

58. The method of claim 57, wherein the heterolgous polypeptide comprises a constant domain (Fc) of immunoglobulin or a portion thereof.

59. The method of claim 57, wherein the heterologous polypeptide comprises albumin.

60. The method of claim 59, wherein albumin comprises human serum albumin.

61. The method of claim 48, wherein the cell is a neural cell.

62. The method of claim 48, wherein the cell is a cardiac cell.

63. A method of protecting a cell against calcium-mediated cell death, comprising contacting the cell with a stanniocalcin polypeptide selected from the group consisting of:

(a) a polypeptide comprising V-34 to A-247 of SEQ ID NO:2;

(b) a polypeptide having an amino acid sequence that is at least 90% identical to (a), wherein the polypeptide has stanniocalcin biological activity;

(c) a polypeptide comprising a fragment of the amino acid sequence of SEQ ID NO:2, wherein the fragment has stanniocalcin biological activity;

(d) a polypeptide comprising a fragment of the polypeptide encoded by the human cDNA of ATCC Deposit No. 75652, wherein the fragment has stanniocalcin biological activity;

(e) a polypeptide comprising an N-terminal deletion fragment described by the general formula m-247 of SEQ ID NO:2, wherein m is an integer from 2 to 242 and the deletion fragment has stanniocalcin biological activity;

(f) a polypeptide comprising a C-terminal deletion fragment described by the general formula 1-n of SEQ ID NO:2, wherein n is an integer between 7 to 246 and the deletion fragment has stanniocalcin biological activity; and

(g) a polypeptide comprising an N-terminal and C-terminal deletion fragment described by the general formula m-n of SEQ ID NO:2, wherein m is an integer from 2 to 242, n is an integer from 7 to 246, and the deletion fragment has stanniocalcin biological activity.The method of claim 64, wherein the polypeptide is (a).

64. The method of claim 63, wherein the polypeptide is (a).

65. The method of claim 63, wherein the polypeptide is (b).

66. The method of claim 63, wherein the polypeptide is (c).

67. The method of claim 63, wherein the polypeptide is (d).

68. The method of claim 63, wherein the polypeptide is (e).

69. The method of claim 63, wherein the polypeptide is (f).

70. The method of claim 63, wherein the polypeptide is (g).

71. The method of claim 63, wherein the polypeptide has an amino acid sequence that is at least 95% identical to (a) and has stanniocalcin biological activity.

72. The method of claim 63, wherein the polypeptide is fused to a heterolgous polypeptide.

73. The method of claim 72, wherein the heterolgous polypeptide comprises a constant domain (Fc) of immunoglobulin or a portion thereof.

74. The method of claim 72, wherein the heterologous polypeptide comprises albumin.

75. The method of claim 74, wherein albumin comprises human serum albumin.

76. The method of claim 63, wherein the cell is a neural cell.

77. The method of claim 63, wherein the cell is a cardiac cell.

78. A method of diagnosing neural injury, comprising the steps of:

(I) assaying expression levels of a stanniocalcin polypeptide in cells or body fluid of an individual, wherein the polypeptide is selected from the group consisting of:

(a) a polypeptide comprising V-34 to A-247 of SEQ ID NO:2;

(b) a polypeptide having an amino acid sequence that is at least 90% identical to (a), wherein the polypeptide has stanniocalcin biological activity;

(c) a polypeptide comprising a fragment of the amino acid sequence of SEQ ID NO:2, wherein the fragment has stanniocalcin biological activity;

(d) a polypeptide comprising a fragment of the polypeptide encoded by the human cDNA of ATCC Deposit No. 75652, wherein the fragment has stanniocalcin biological activity;

(e) a polypeptide comprising an N-terminal deletion fragment described by the general formula m-247 of SEQ ID NO:2, wherein m is an integer from 2 to 242 and the deletion fragment has stanniocalcin biological activity;

(f) a polypeptide comprising a C-terminal deletion fragment described by the general formula 1-n of SEQ ID NO:2, wherein n is an integer between 7 to 246 and the deletion fragment has stanniocalcin biological activity; and

(g) a polypeptide comprising an N-terminal and C-terminal deletion fragment described by the general formula m-n of SEQ ID NO:2, wherein m is an integer from 2 to 242, n is an integer from 7 to 246, and the deletion fragment has stanniocalcin biological activity.The method of claim 64, wherein the polypeptide is (a); and

(II) comparing the polypeptide expression level with a standard expression level, whereby an increase or decrease in the assayed expression level compared to the standard expression level is indicative of a injury.

79. The method of claim 78, wherein the polypeptide is (a).

80. The method of claim 78, wherein the polypeptide is (b).

81. The method of claim 78, wherein the polypeptide is (c).

82. The method of claim 78, wherein the polypeptide is (d).

83. The method of claim 78, wherein the polypeptide is (e).

84. The method of claim 78, wherein the polypeptide is (f).

85. The method of claim 78, wherein the polypeptide is (g).

86. The method of claim 78, wherein the polypeptide has an amino acid sequence that is at least 95% identical to (a) and has stanniocalcin biological activity.

87. The method of claim 78, wherein the polypeptide is fused to a heterolgous polypeptide.

88. The method of claim 87, wherein the heterolgous polypeptide comprises a constant domain (Fc) of immunoglobulin or a portion thereof.

89. The method of claim 87, wherein the heterologous polypeptide comprises albumin.

90. The method of claim 89, wherein albumin comprises human serum albumin.

91. The method of claim 78, wherein cells comprise neural cells.

92. The method of claim 78, wherein cells comprise cardiac cells.

93. The method of claim 78, wherein the neural injury is associated with a heart attack or stroke.

94. The method of claim 78, wherein the neural injury comprises hypoxia.

95. The method of claim 78, wherein the neural injury comprises ischemia.

96. The method of claim 78, wherein an increase in the assayed polypeptide expression level compared to the standard expression level is indicative of neural injury.

97. The method of claim 78, wherein a decrease in the assayed polypeptide expression level compared to the standard expression level is indicative of neural injury.

98. The method of claim 78, wherein an increase in the assayed polypeptide expression level compared to the standard expression level is indicative of hypoxia.

99. The method of claim 78, wherein the step of assaying expression levels comprises contacting the cells or body fluid of an individual with an antibody that specifically binds a polypeptide selected from (a)-(g).

100. The method of claim 99, wherein the antibody binds to a polypeptide selected from (a)-(g) in an ELISA.

101. The method of claim 99, wherein the antibody binds to a polypeptide selected from (a)-(g) in a Western assay.

102. The method of claim 99, wherein the assay comprises a radioimmunassay.

103. A method of protecting a patient against neural injury comprising administering to the patient a therapeutically effective amount of a stanniocalcin polypeptide selected from the group consisting of:

(a) a polypeptide comprising V-34 to A-247 of SEQ ID NO:2;

(b) a polypeptide having an amino acid sequence that is at least 90% identical to (a), wherein the polypeptide has stanniocalcin biological activity;

(c) a polypeptide comprising a fragment of the amino acid sequence of SEQ ID NO:2, wherein the fragment has stanniocalcin biological activity;

(d) a polypeptide comprising a fragment of the polypeptide encoded by the human cDNA of ATCC Deposit No. 75652, wherein the fragment has stanniocalcin biological activity;

(e) a polypeptide comprising an N-terminal deletion fragment described by the general formula m-247 of SEQ ID NO:2, wherein m is an integer from 2 to 242 and the deletion fragment has stanniocalcin biological activity;

(f) a polypeptide comprising a C-terminal deletion fragment described by the general formula 1-n of SEQ ID NO:2, wherein n is an integer between 7 to 246 and the deletion fragment has stanniocalcin biological activity; and

(g) a polypeptide comprising an N-terminal and C-terminal deletion fragment described by the general formula m-n of SEQ ID NO:2, wherein m is an integer from 2 to 242, n is an integer from 7 to 246, and the deletion fragment has stanniocalcin biological activity.The method of claim 64, wherein the polypeptide is (a).

104. The method of claim 103, wherein the polypeptide is (a).

105. The method of claim 103, wherein the polypeptide is (b).

106. The method of claim 103, wherein the polypeptide is (c).

107. The method of claim 103, wherein the polypeptide is (d).

108. The method of claim 103, wherein the polypeptide is (e).

109. The method of claim 103, wherein the polypeptide is (f).

110. The method of claim 103, wherein the polypeptide is (g).

111. The method of claim 103, wherein the polypeptide has an amino acid sequence that is at least 95% identical to (a) and has stanniocalcin biological activity.

112. The method of claim 103, wherein the polypeptide is fused to a heterolgous polypeptide.

113. The method of claim 112, wherein the heterolgous polypeptide comprises a constant domain (Fc) of immunoglobulin or a portion thereof.

114. The method of claim 112, wherein the heterologous polypeptide comprises albumin.

115. The method of claim 114, wherein albumin comprises human serum albumin.

116. The method of claim 103, wherein cells comprise neural cells.

117. The method of claim 103, wherein cells comprise cardiac cells.

118. The method of claim 103, wherein the neural injury is associated with a heart attack or stroke.

119. The method of claim 103, wherein the neural injury comprises hypoxia.

120. The method of claim 103, wherein the neural injury comprises ischemia.

121. A method of treating a patient having neural injury comprising administering to the patient a therapeutically effective amount of a stanniocalcin polypeptide selected from the group consisting of:

(a) a polypeptide comprising V-34 to A-247 of SEQ ID NO:2;

(b) a polypeptide having an amino acid sequence that is at least 90% identical to (a), wherein the polypeptide has stanniocalcin biological activity;

(c) a polypeptide comprising a fragment of the amino acid sequence of SEQ ID NO:2, wherein the fragment has stanniocalcin biological activity;

(d) a polypeptide comprising a fragment of the polypeptide encoded by the human cDNA of ATCC Deposit No. 75652, wherein the fragment has stanniocalcin biological activity;

(e) a polypeptide comprising an N-terminal deletion fragment described by the general formula m-247 of SEQ ID NO:2, wherein m is an integer from 2 to 242 and the deletion fragment has stanniocalcin biological activity;

(f) a polypeptide comprising a C-terminal deletion fragment described by the general formula 1-n of SEQ ID NO:2, wherein n is an integer between 7 to 246 and the deletion fragment has stanniocalcin biological activity; and

(g) a polypeptide comprising an N-terminal and C-terminal deletion fragment described by the general formula m-n of SEQ ID NO:2, wherein m is an integer from 2 to 242, n is an integer from 7 to 246, and the deletion fragment has stanniocalcin biological activity.The method of claim 64, wherein the polypeptide is (a).

122. The method of claim 121, wherein the polypeptide is (a).

123. The method of claim 121, wherein the polypeptide is (b).

124. The method of claim 121, wherein the polypeptide is (c).

125. The method of claim 121, wherein the polypeptide is (d).

126. The method of claim 121, wherein the polypeptide is (e).

127. The method of claim 121, wherein the polypeptide is (f).

128. The method of claim 121, wherein the polypeptide is (g).

129. The method of claim 121, wherein the polypeptide has an amino acid sequence that is at least 95% identical to (a) and has stanniocalcin biological activity.

130. The method of claim 121, wherein the polypeptide is fused to a heterolgous polypeptide.

131. The method of claim 130, wherein the heterolgous polypeptide comprises a constant domain (Fc) of immunoglobulin or a portion thereof.

132. The method of claim 130, wherein the heterologous polypeptide comprises albumin.

133. The method of claim 132, wherein albumin comprises human serum albumin.

134. The method of claim 121, wherein cells comprise neural cells.

135. The method of claim 121, wherein cells comprise cardiac cells.

136. The method of claim 121, wherein the neural injury is associated with a heart attack or stroke.

137. The method of claim 121, wherein the neural injury comprises hypoxia.

138. The method of claim 121, wherein the neural injury comprises ischemia.